2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

LABORATORY REPORT

September 18, 2014

Andy Limmer
Weaver Boos Consultants
1604 Eastport Plaza Drive, Suite 104
Collinsville, IL 62234

RE: Cottonwood Hills RDF Flare Gas Sample

Dear Andy:

Enclosed are the results of the samples submitted to our laboratory on September 4, 2014. For your reference, these analyses have been assigned our service request number P1403572.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Sue Anderson at 2:35 pm, Sep 18, 2014

Sue Anderson
Project Manager

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Client: Weaver Boos Consultants
Project: Cottonwood Hills RDF Flare Gas Sample

Service Request No: P1403572

CASE NARRATIVE

The samples were received intact under chain of custody on September 4, 2014 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

BTU and CHONS Analysis

The results for BTU and CHONS were generated according to ASTM D 3588-98. The following analyses were performed and used to calculate the BTU and CHONS results. This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

C2 through C6 Hydrocarbon Analysis

The samples were analyzed according to modified EPA Method TO-3 for C2 through >C6 hydrocarbons using a gas chromatograph equipped with a flame ionization detector (FID). This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

Fixed Gases Analysis

The samples were also analyzed for fixed gases (hydrogen, oxygen/argon, nitrogen, carbon monoxide, methane and carbon dioxide) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This method is not included on the laboratory's NELAP or AIHA-LAP scope of accreditation.

Hydrogen Sulfide Analysis

The samples were also analyzed for hydrogen sulfide per ASTM D 5504-12 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

Sulfur Analysis

The samples were also analyzed for twenty sulfur compounds per ASTM D 5504-12 using a gas chromatograph equipped with a sulfur chemiluminescence detector (SCD). All compounds with the exception of hydrogen sulfide and carbonyl sulfide are quantitated against the initial calibration curve for methyl mercaptan. This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

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Client: Weaver Boos Consultants
Project: Cottonwood Hills RDF Flare Gas Sample

Service Request No: P1403572

CASE NARRATIVE

Total Gaseous Non-Methane Organics as Methane Analysis

The samples were also analyzed for total gaseous non-methane organics as methane according to modified EPA Method 25C. The analyses included a single sample injection (method modification) analyzed by gas chromatography using flame ionization detection/total combustion analysis. This method is not included on the laboratory's NELAP, DoD-ELAP, or AIHA-LAP scope of accreditation.

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ALS Environmental – Simi Valley

Certifications, Accreditations, and Registrations

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	643428
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	CA200007
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-14-5
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272014-4
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Weaver Boos Consultants

Service Request: P1403572

Project ID: Cottonwood Hills RDF Flare Gas Sample

Date Received: 9/4/2014

Time Received: 07:44

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pfl (psig)	TO-3 Modified - C1C6+ Can	3C Modified - Fxd Gases Can	ASTM D5504-01 - H2S Can	ASTM D 5504-12 - Sulfur Can	25C Modified - TGNMO+ 1X Can
CWH-1	P1403572-001	Air	9/3/2014	12:53	SSC00258	-2.36	3.73	X	X	X	X	X
CWH-2	P1403572-002	Air	9/3/2014	13:17	SSC00223	-1.95	3.67	X	X	X	X	X
CWH-3	P1403572-003	Air	9/3/2014	13:34	SSC00072	-2.53	3.59	X	X	X	X	X

Air - Chain of Custody Record & Analytical Service Request

P1403572

2655 Park Center Drive, Suite A
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Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No P1403572

Company Name & Address (Reporting Information)
Weaver Boos Consultants
1604 Eastport Plaza Drive Suite 104
Collinsville, Illinois 62234

Project Name: Cottonwood Hills RDF Flare Gas Sample

Project Number: 0086-440-10-03

Project Manager: Andy Limmer

P.O. # / Billing Information

Phone: (618) 830-1317

Fax:

Email Address for Result Reporting: alimmer@weaverboos.com

Sampler (Print & Sign)

ALS Contact:

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume (L)	EPA TO-15 (75 Cmpds 0.1 ug/L + TICs + 20 reduced Sulfurs)		Comments e.g. Actual Preservative or specific instructions
CWH-1		9/3/14	1253	SSC00258	SOA00024	—	—	6.0	X	-2.27	
CWH-2		9/3/14	1317	SSC00223	SOA00144	—	—	6.0	X	-1.88	
CWH-3		9/3/14	1334	SSC0072	SOA00015	—	—	6.0	X	-2.73	

Report Tier Levels - please select

Tier I - Results (Default in not specified) _____
Tier II (Results + QC Summaries _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Date Validation Package) 10% Surcharge _____

EDD required YES / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	9/3/14	1630	[signature]	9/4/14	0744
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature _____°C

WEAVER BOOS CONSULTANTS
LANDFILL GAS FLARE TESTING LOG

Waste Management, Inc.
Cottonwood Hills Recycling and Disposal Facility
Marissa, IL

Sampler: Frank Barthol

Date: 9/3/14
Sample I.D.: Cwlf - 1
Vessel I.D.: SSC00258 Flow Controler ID: SOA00024
Vessel Vol.: 6.0 liter

Temperature Measurements
- Flare Temp.*: 1494 Deg. F
- Gas Temp.**: 128 Deg. F

*Recorded From Flare Chart Recorder
** Measured with in-line thermometer

Pressure Measurement
- Static Pressure*: — Inches H20

* Measured with in-line Gauge

Flow Rate Record
- Time: 1255
- Flow Rate*: 1075 SCFM

*Recorded from continuous flowmeter

Summa Canister Vacuum Readings
- Initial Vacuum: — Inches Hg
- Final Vacuum: — Inches Hg

- Start Time: 1253
- End Time: 1308

WEAVER BOOS CONSULTANTS
LANDFILL GAS FLARE TESTING LOG

Waste Management, Inc.
Cottonwood Hills Recycling and Disposal Facility
Marissa, IL

Sampler: Frank Barthol

Date: 9/3/19
Sample I.D.: CWH-2
Vessel I.D.: SSC00223 Flow Controler ID: SOA001144
Vessel Vol.: 6.0 liter

Temperature Measurements
Flare Temp.*: 1425 Deg. F
Gas Temp.**: 128 Deg. F
*Recorded From Flare Chart Recorder
** Measured with in-line thermometer

Pressure Measurement
Static Pressure*: — Inches H20
* Measured with in-line Gauge

Flow Rate Record
Time: 1319
Flow Rate*: 1078 SCFM
*Recorded from continuous flowmeter

Summa Canister Vacuum Readings
Initial Vacuum: — Inches Hg
Final Vacuum: — Inches Hg

Start Time: 1317
End Time: 1332

WEAVER BOOS CONSULTANTS
LANDFILL GAS FLARE TESTING LOG

Waste Management, Inc.
Cottonwood Hills Recycling and Disposal Facility
Marissa, IL

Sampler: Frank Barthel

Date: 9/3/14
Sample I.D.: CWH-3
Vessel I.D.: SSC0072 Flow Controler ID: SOA000015
Vessel Vol.: 6.0 liter

Temperature Measurements
Flare Temp.*: 1457 Deg. F
Gas Temp.**: 129 Deg. F
*Recorded From Flare Chart Recorder
** Measured with in-line thermometer

Pressure Measurement
Static Pressure*: - Inches H20
* Measured with in-line Gauge

Flow Rate Record
Time: 1336
Flow Rate*: 1067 SCFM
*Recorded from continuous flowmeter

Summa Canister Vacuum Readings
Initial Vacuum: - Inches Hg
Final Vacuum: - Inches Hg

Start Time: 1334
End Time: 1349

ALS Environmental
Sample Acceptance Check Form

Client: Weaver Boos Consultants Work order: P1403572

Project: Cottonwood Hills RDF Flare Gas Sample / 0086-440-10-03

Sample(s) received on: 9/4/14 Date opened: 9/4/14 by: KKELPE

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by ALS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1403572-001.01	6.0 L Silonite Can					
P1403572-002.01	6.0 L Silonite Can					
P1403572-003.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Sample ID: **CWH-1** ALS Project ID: P1403572
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample** ALS Sample ID: P1403572-001

Test Code: ASTM D3588-98
Analyst: Mike Conejo/Nalini Lall Date Collected: 9/3/14
Sample Type: 6.0 L Silonite Canister Date Received: 9/4/14
Test Notes:
Container ID: SSC00258

Canister Dilution Factor: 3.05

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	**0.64**	**0.05**	
Oxygen + Argon	**2.65**	**3.06**	
Nitrogen	**13.22**	**13.40**	
Carbon Monoxide	< 0.01	< 0.01	
Methane	**48.90**	**28.37**	
Carbon Dioxide	**34.52**	**54.95**	
Hydrogen Sulfide	**0.02**	**0.03**	
C2 as Ethane	< 0.01	< 0.01	
C3 as Propane	< 0.01	< 0.01	
C4 as n-Butane	< 0.01	< 0.01	
C5 as n-Pentane	< 0.01	**0.02**	
C6 as n-Hexane	< 0.01	**0.02**	
> C6 as n-Hexane	**0.02**	**0.07**	
TOTALS	**99.99**	**99.99**	

Components	Mole %	Weight %
Carbon	**21.89**	**36.33**
Hydrogen	**51.72**	**7.20**
Oxygen + Argon	**19.46**	**43.04**
Nitrogen	**6.93**	**13.41**
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		**0.9544**
Specific Volume	ft3/lb	**13.73**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**499.3**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**449.5**
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**489.3**
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**440.5**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,854.8**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,171.2**
Compressibility Factor "Z" (60 F, 14.696 psia)		**0.9974**

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Sample ID: **CWH-2** ALS Project ID: P1403572
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample** ALS Sample ID: P1403572-002

Test Code: ASTM D3588-98
Analyst: Mike Conejo/Nalini Lall Date Collected: 9/3/14
Sample Type: 6.0 L Silonite Canister Date Received: 9/4/14
Test Notes:
Container ID: SSC00223

Canister Dilution Factor: 2.85

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	**0.67**	**0.05**	
Oxygen + Argon	**2.09**	**2.42**	
Nitrogen	**11.37**	**11.52**	
Carbon Monoxide	< 0.01	< 0.01	
Methane	**50.14**	**29.08**	
Carbon Dioxide	**35.62**	**56.68**	
Hydrogen Sulfide	**0.03**	**0.04**	
C2 as Ethane	< 0.01	< 0.01	
C3 as Propane	< 0.01	< 0.01	
C4 as n-Butane	< 0.01	< 0.01	
C5 as n-Pentane	< 0.01	**0.02**	
C6 as n-Hexane	< 0.01	**0.02**	
> C6 as n-Hexane	**0.03**	**0.13**	
TOTALS	**99.99**	**99.99**	

Components	Mole %	Weight %
Carbon	**22.23**	**37.39**
Hydrogen	**52.40**	**7.40**
Oxygen + Argon	**19.49**	**43.65**
Nitrogen	**5.88**	**11.52**
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		**0.9548**
Specific Volume	ft3/lb	**13.72**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**513.2**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**462.0**
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**502.8**
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**452.7**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**7,041.7**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,339.8**
Compressibility Factor "Z" (60 F, 14.696 psia)		**0.9973**

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Sample ID: **CWH-3** ALS Project ID: P1403572
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample** ALS Sample ID: P1403572-003

Test Code: ASTM D3588-98
Analyst: Mike Conejo/Nalini Lall Date Collected: 9/3/14
Sample Type: 6.0 L Silonite Canister Date Received: 9/4/14
Test Notes:
Container ID: SSC00072

Canister Dilution Factor: 3.12

Components	Result Volume %	Result Weight %	Data Qualifier
Hydrogen	**0.65**	**0.05**	
Oxygen + Argon	**2.24**	**2.59**	
Nitrogen	**11.88**	**12.03**	
Carbon Monoxide	< 0.01	< 0.01	
Methane	**49.74**	**28.83**	
Carbon Dioxide	**35.40**	**56.29**	
Hydrogen Sulfide	**0.01**	**0.01**	
C2 as Ethane	< 0.01	< 0.01	
C3 as Propane	< 0.01	< 0.01	
C4 as n-Butane	< 0.01	< 0.01	
C5 as n-Pentane	< 0.01	**0.02**	
C6 as n-Hexane	< 0.01	**0.02**	
> C6 as n-Hexane	**0.03**	**0.14**	
TOTALS	**99.99**	**99.99**	

Components	Mole %	Weight %
Carbon	**22.15**	**37.09**
Hydrogen	**52.16**	**7.33**
Oxygen + Argon	**19.52**	**43.54**
Nitrogen	**6.16**	**12.03**
Sulfur	< 0.10	< 0.10

Specific Gravity (Air = 1)		**0.9556**
Specific Volume	ft3/lb	**13.71**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**508.9**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/ft3	**458.2**
Gross Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**498.7**
Net Heating Value (Water Saturated at 0.25636 psia)	BTU/ft3	**449.0**
Gross Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,977.6**
Net Heating Value (Dry Gas @ 60 F, 14.696 psia)	BTU/lb	**6,282.1**
Compressibility Factor "Z" (60 F, 14.696 psia)		**0.9973**

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Sample ID: **CWH-1**
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample**

ALS Project ID: P1403572
ALS Sample ID: P1403572-001

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00258

Date Collected: 9/3/14
Date Received: 9/4/14
Date Analyzed: 9/8/14
Volume(s) Analyzed: 0.10 ml(s)

Canister Dilution Factor: 3.05

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	**Hydrogen**	**0.644**	0.31	
7782-44-7	**Oxygen +**			
7440-37-1	**Argon**	**2.65**	0.31	
7727-37-9	**Nitrogen**	**13.2**	0.31	
630-08-0	Carbon Monoxide	ND	0.31	
74-82-8	**Methane**	**48.9**	0.31	
124-38-9	**Carbon Dioxide**	**34.5**	0.31	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Sample ID: **CWH-2** ALS Project ID: P1403572
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample** ALS Sample ID: P1403572-002

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00223

Date Collected: 9/3/14
Date Received: 9/4/14
Date Analyzed: 9/8/14
Volume(s) Analyzed: 0.10 ml(s)

Canister Dilution Factor: 2.85

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	**Hydrogen**	**0.674**	0.29	
7782-44-7	**Oxygen +**			
7440-37-1	**Argon**	**2.09**	0.29	
7727-37-9	**Nitrogen**	**11.4**	0.29	
630-08-0	Carbon Monoxide	ND	0.29	
74-82-8	**Methane**	**50.2**	0.29	
124-38-9	**Carbon Dioxide**	**35.7**	0.29	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Sample ID: **CWH-3** ALS Project ID: P1403572
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample** ALS Sample ID: P1403572-003

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00072

Date Collected: 9/3/14
Date Received: 9/4/14
Date Analyzed: 9/8/14
Volume(s) Analyzed: 0.10 ml(s)

Canister Dilution Factor: 3.12

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	**Hydrogen**	**0.655**	0.31	
7782-44-7	**Oxygen +**			
7440-37-1	**Argon**	**2.24**	0.31	
7727-37-9	**Nitrogen**	**11.9**	0.31	
630-08-0	Carbon Monoxide	ND	0.31	
74-82-8	**Methane**	**49.8**	0.31	
124-38-9	**Carbon Dioxide**	**35.4**	0.31	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Sample ID: **Method Blank** ALS Project ID: P1403572
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample** ALS Sample ID: P140908-MB

Test Code: EPA Method 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Nalini Lall Date Analyzed: 9/08/14
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.10	
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	
630-08-0	Carbon Monoxide	ND	0.10	
74-82-8	Methane	ND	0.10	
124-38-9	Carbon Dioxide	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Weaver Boos Consultants**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1403572
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample** ALS Sample ID: P140908-LCS

Test Code: EPA Method 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Nalini Lall Date Analyzed: 9/08/14
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
1333-74-0	Hydrogen	40,000	**38,600**	**97**	84-110	
7782-44-7	Oxygen +					
7440-37-1	Argon	50,000	**49,900**	**100**	88-114	
7727-37-9	Nitrogen	50,000	**50,900**	**102**	88-114	
630-08-0	Carbon Monoxide	50,000	**50,300**	**101**	88-113	
74-82-8	Methane	40,000	**39,400**	**99**	87-110	
124-38-9	Carbon Dioxide	50,000	**49,800**	**100**	84-109	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Sample ID: **CWH-1**
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample**

ALS Project ID: P1403572
ALS Sample ID: P1403572-001

Test Code: ASTM D 5504-12
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00258

Date Collected: 9/3/14
Time Collected: 12:53
Date Received: 9/4/14
Date Analyzed: 9/5/14
Time Analyzed: 10:28
Volume(s) Analyzed: 0.10 ml(s)

Canister Dilution Factor: 3.05

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**290,000**	210	**210,000**	150	
463-58-1	Carbonyl Sulfide	**2,100**	370	**850**	150	
74-93-1	Methyl Mercaptan	**7,700**	300	**3,900**	150	
75-08-1	Ethyl Mercaptan	ND	390	ND	150	
75-18-3	Dimethyl Sulfide	**14,000**	390	**5,700**	150	
75-15-0	Carbon Disulfide	**1,300**	240	**420**	76	
75-33-2	Isopropyl Mercaptan	**5,900**	470	**1,900**	150	
75-66-1	tert-Butyl Mercaptan	ND	560	ND	150	
107-03-9	n-Propyl Mercaptan	ND	470	ND	150	
624-89-5	Ethyl Methyl Sulfide	ND	470	ND	150	
110-02-1	Thiophene	**3,700**	520	**1,100**	150	
513-44-0	Isobutyl Mercaptan	ND	560	ND	150	
352-93-2	Diethyl Sulfide	ND	560	ND	150	
109-79-5	n-Butyl Mercaptan	ND	560	ND	150	
624-92-0	Dimethyl Disulfide	ND	290	ND	76	
616-44-4	3-Methylthiophene	ND	610	ND	150	
110-01-0	Tetrahydrothiophene	ND	550	ND	150	
638-02-8	2,5-Dimethylthiophene	ND	700	ND	150	
872-55-9	2-Ethylthiophene	ND	700	ND	150	
110-81-6	Diethyl Disulfide	ND	380	ND	76	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Sample ID: **CWH-2**
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample**

ALS Project ID: P1403572
ALS Sample ID: P1403572-002

Test Code: ASTM D 5504-12
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00223

Date Collected: 9/3/14
Time Collected: 13:17
Date Received: 9/4/14
Date Analyzed: 9/5/14
Time Analyzed: 10:43
Volume(s) Analyzed: 0.10 ml(s)

Canister Dilution Factor: 2.85

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**470,000**	200	**340,000**	140	
463-58-1	Carbonyl Sulfide	**2,400**	350	**970**	140	
74-93-1	Methyl Mercaptan	**12,000**	280	**6,100**	140	
75-08-1	Ethyl Mercaptan	ND	360	ND	140	
75-18-3	Dimethyl Sulfide	**18,000**	360	**7,000**	140	
75-15-0	Carbon Disulfide	**1,700**	220	**550**	71	
75-33-2	Isopropyl Mercaptan	**8,600**	440	**2,700**	140	
75-66-1	tert-Butyl Mercaptan	**1,400**	530	**390**	140	
107-03-9	n-Propyl Mercaptan	ND	440	ND	140	
624-89-5	Ethyl Methyl Sulfide	ND	440	ND	140	
110-02-1	Thiophene	**6,300**	490	**1,800**	140	
513-44-0	Isobutyl Mercaptan	ND	530	ND	140	
352-93-2	Diethyl Sulfide	ND	530	ND	140	
109-79-5	n-Butyl Mercaptan	ND	530	ND	140	
624-92-0	Dimethyl Disulfide	ND	270	ND	71	
616-44-4	3-Methylthiophene	ND	570	ND	140	
110-01-0	Tetrahydrothiophene	ND	510	ND	140	
638-02-8	2,5-Dimethylthiophene	ND	650	ND	140	
872-55-9	2-Ethylthiophene	ND	650	ND	140	
110-81-6	Diethyl Disulfide	ND	360	ND	71	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Sample ID: **CWH-3** ALS Project ID: P1403572
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample** ALS Sample ID: P1403572-003

Test Code:	ASTM D 5504-12	Date Collected:	9/3/14
Instrument ID:	Agilent 6890A/GC13/SCD	Time Collected:	13:34
Analyst:	Mike Conejo	Date Received:	9/4/14
Sample Type:	6.0 L Silonite Canister	Date Analyzed:	9/5/14
Test Notes:		Time Analyzed:	11:03
Container ID:	SSC00072	Volume(s) Analyzed:	0.10 ml(s)

Canister Dilution Factor: 3.12

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	**150,000**	220	**110,000**	160	
463-58-1	Carbonyl Sulfide	**2,000**	380	**820**	160	
74-93-1	Methyl Mercaptan	**5,800**	310	**2,900**	160	
75-08-1	Ethyl Mercaptan	ND	400	ND	160	
75-18-3	Dimethyl Sulfide	**13,000**	400	**5,000**	160	
75-15-0	Carbon Disulfide	**1,200**	240	**390**	78	
75-33-2	Isopropyl Mercaptan	**4,900**	490	**1,600**	160	
75-66-1	tert-Butyl Mercaptan	ND	580	ND	160	
107-03-9	n-Propyl Mercaptan	ND	490	ND	160	
624-89-5	Ethyl Methyl Sulfide	ND	490	ND	160	
110-02-1	Thiophene	**3,100**	540	**910**	160	
513-44-0	Isobutyl Mercaptan	ND	580	ND	160	
352-93-2	Diethyl Sulfide	ND	580	ND	160	
109-79-5	n-Butyl Mercaptan	ND	580	ND	160	
624-92-0	Dimethyl Disulfide	ND	300	ND	78	
616-44-4	3-Methylthiophene	ND	630	ND	160	
110-01-0	Tetrahydrothiophene	ND	560	ND	160	
638-02-8	2,5-Dimethylthiophene	ND	720	ND	160	
872-55-9	2-Ethylthiophene	ND	720	ND	160	
110-81-6	Diethyl Disulfide	ND	390	ND	78	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Sample ID: **Method Blank**
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample**

ALS Project ID: P1403572
ALS Sample ID: P140905-MB

Test Code: ASTM D 5504-12
Instrument ID: Agilent 6890A/GC13/SCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: NA
Time Collected: NA
Date Received: NA
Date Analyzed: 9/05/14
Time Analyzed: 08:00
Volume(s) Analyzed: 1.0 ml(s)

CAS #	Compound	Result µg/m³	MRL µg/m³	Result ppbV	MRL ppbV	Data Qualifier
7783-06-4	Hydrogen Sulfide	ND	7.0	ND	5.0	
463-58-1	Carbonyl Sulfide	ND	12	ND	5.0	
74-93-1	Methyl Mercaptan	ND	9.8	ND	5.0	
75-08-1	Ethyl Mercaptan	ND	13	ND	5.0	
75-18-3	Dimethyl Sulfide	ND	13	ND	5.0	
75-15-0	Carbon Disulfide	ND	7.8	ND	2.5	
75-33-2	Isopropyl Mercaptan	ND	16	ND	5.0	
75-66-1	tert-Butyl Mercaptan	ND	18	ND	5.0	
107-03-9	n-Propyl Mercaptan	ND	16	ND	5.0	
624-89-5	Ethyl Methyl Sulfide	ND	16	ND	5.0	
110-02-1	Thiophene	ND	17	ND	5.0	
513-44-0	Isobutyl Mercaptan	ND	18	ND	5.0	
352-93-2	Diethyl Sulfide	ND	18	ND	5.0	
109-79-5	n-Butyl Mercaptan	ND	18	ND	5.0	
624-92-0	Dimethyl Disulfide	ND	9.6	ND	2.5	
616-44-4	3-Methylthiophene	ND	20	ND	5.0	
110-01-0	Tetrahydrothiophene	ND	18	ND	5.0	
638-02-8	2,5-Dimethylthiophene	ND	23	ND	5.0	
872-55-9	2-Ethylthiophene	ND	23	ND	5.0	
110-81-6	Diethyl Disulfide	ND	12	ND	2.5	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Weaver Boos Consultants**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1403572
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample** ALS Sample ID: P140905-LCS

Test Code: ASTM D 5504-12 Date Collected: NA
Instrument ID: Agilent 6890A/GC13/SCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 9/05/14
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppbV	Result ppbV	% Recovery	ALS Acceptance Limits	Data Qualifier
7783-06-4	Hydrogen Sulfide	2,050	**1,570**	**77**	66-131	
463-58-1	Carbonyl Sulfide	2,020	**1,560**	**77**	64-131	
74-93-1	Methyl Mercaptan	1,890	**1,600**	**85**	68-160	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Weaver Boos Consultants**
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample** ALS Project ID: P1403572

Total Gaseous Nonmethane Organics (TGNMO) as Methane

Test Code: EPA Method 25C Modified
Instrument ID: HP5890 II/GC1/FID/TCA Date(s) Collected: 9/3/14
Analyst: Wade Henton Date Received: 9/4/14
Sampling Media: 6.0 L Silonite Canister(s) Date Analyzed: 9/6/14
Test Notes:

Client Sample ID	ALS Sample ID	Canister Dilution Factor	Injection Volume ml(s)	Result ppmV	MRL ppmV	Data Qualifier
CWH-1	P1403572-001	3.05	0.50	**3,200**	3.1	
CWH-2	P1403572-002	2.85	0.50	**4,400**	2.9	
CWH-3	P1403572-003	3.12	0.50	**4,500**	3.1	
Method Blank	P140906-MB	1.00	0.50	ND	1.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Weaver Boos Consultants**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1403572
Client Project ID: **Cottonwood Hills RDF Flare Gas Sample** ALS Sample ID: P140906-LCS

Test Code: EPA Method 25C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/FID/TCA Date Received: NA
Analyst: Wade Henton Date Analyzed: 9/06/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

Compound	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
Total Gaseous Nonmethane Organics (TGNMO) as Methane	199	**190**	**95**	81-119	